

## Predicting a Precipitate - Worksheet - ANSWERS

1. Determine whether or not a precipitate forms in each of the following:

- a. 10.0 mL of 0.0100 mol/L  $\text{AgNO}_3$  + 10.0 mL of 0.100 mol/L  $\text{Na}_2\text{SO}_4$ .  
 $K_{\text{sp}} (\text{Ag}_2\text{SO}_4) = 1.2 \times 10^{-5}$

$Q = 1.25 \times 10^{-6}$ , since  $Q < K_{\text{sp}}$  there is NO PPT

- b. 500 mL of 0.0004 mol/L  $\text{BaCl}_2$  + 500 mL of 0.0004 mol/L  $\text{Na}_2\text{SO}_4$ .  
 $K_{\text{sp}} (\text{BaSO}_4) = 1.0 \times 10^{-10}$

$Q = 4 \times 10^{-8}$ , since  $Q > K_{\text{sp}}$  there is a PPT

- c. 50.00 mL of 0.0020 mol/L  $\text{AgNO}_3$  + 250.0 mL of 0.020 mol/L  $\text{KBrO}_3$ .  
 $K_{\text{sp}} (\text{AgBrO}_3) = 5.4 \times 10^{-5}$

$Q = 5.6 \times 10^{-6}$ , since  $Q < K_{\text{sp}}$  there is NO PPT

- d. 10 mL of 0.1 mol/L  $\text{AgNO}_3$  + 90 mL of  $1 \times 10^{-10}$  mol/L  $\text{KI}$   
 $K_{\text{sp}} (\text{AgI}) = 8.3 \times 10^{-17}$

$Q = 9 \times 10^{-13}$ , since  $Q > K_{\text{sp}}$  there is a PPT

2. If 0.010 mol of  $\text{AgNO}_3$  and 0.00052 mol of  $\text{NaIO}_3$  are dissolved in 2.00 L of water, will a precipitate form?  
 $K_{\text{sp}} (\text{AgIO}_3) = 2.1 \times 10^{-8}$

$Q = 1.3 \times 10^{-6}$ , since  $Q > K_{\text{sp}}$  there is a PPT

3. If  $2 \times 10^{-6}$  mol of  $\text{Cu}(\text{NO}_3)_2$  and  $2 \times 10^{-6}$  mol of  $\text{Na}_2\text{S}$  are dissolved in 10 L of water, will a precipitate form?  
 $K_{\text{sp}} (\text{CuS}) = 2.5 \times 10^{-41}$

$Q = 4 \times 10^{-14}$ , since  $Q > K_{\text{sp}}$  there is a PPT

4. A chemist dissolved 0.0010 mol of  $\text{AgNO}_3$  in 500 mL of 0.00050 mol/L solution of  $\text{NaBrO}_3$ . Did the resulting solution form a precipitate?  
 $K_{\text{sp}} (\text{AgBrO}_3) = 5.4 \times 10^{-5}$

$Q = 1.0 \times 10^{-6}$ , since  $Q < K_{\text{sp}}$  there is NO PPT

5. The  $K_{\text{sp}}$  for calcium sulfate is  $2.6 \times 10^{-4}$ . If 1.0 L of  $2.0 \times 10^{-3}$  M calcium nitrate is added to 1.0 L of  $2.0 \times 10^{-3}$  M aluminum sulfate, will a precipitate form?

$Q = 3.0 \times 10^{-6}$ , since  $Q < K_{\text{sp}}$  there is NO PPT

6. Will a precipitate form if 0.010 mol of  $\text{Sr}(\text{NO}_3)_2$  is added to 1.0 L of a 0.10 mol/L  $\text{Al}_2(\text{CrO}_4)_3$  solution?  
 $K_{\text{sp}} (\text{SrCrO}_4) = 2.6 \times 10^{-3}$

$Q = 3.0 \times 10^{-3}$ , since  $Q > K_{\text{sp}}$  there is a PPT

7. Will a precipitate be formed if 0.084 g of sodium fluoride is dissolved in 1.00 L of 0.010 mol/L  $\text{CaCl}_2$ ?  
 $K_{\text{sp}} (\text{CaF}_2) = 3.9 \times 10^{-11}$

$Q = 4.0 \times 10^{-8}$ , since  $Q > K_{\text{sp}}$  there is a PPT